

3/25/03

PATENT

Attorney Docket No. MTI-31532

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of : Weimer, Ronald A.  
Serial No. : 09/941,827  
Filing Date : August 29, 2001  
For : Method of Improved High K Dielectric-Polysilicon Interface for CMOS Devices  
Examiner : HUYNH, Yennhu B.  
Group Art Unit : 2813  
Confirmation No. : 7551

**CERTIFICATION UNDER 37 CFR 1.8(a) and 1.10**

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Date: 3-25-3

*Patricia Page Pickens*

Assistant Commissioner for Patents  
Washington, D.C. 20231

**THIRD RESPONSE TO RESTRICTION REQUIREMENT**

Sir:

In response to the Examiner's second request for an election of species, mailed February 25, 2003, in the above-identified patent application, Applicant elects Species II: *Claims 2-6 and depending Claims 111-149*, with traverse.

The Examiner has mischaracterized Applicant's statements made in the Response filed December 3, 2002. The Examiner erroneously stated (at page 2; emphasis added):

*However, Applicant states that claim 18-22 is in different species from claim 1-7 by the recited limitation of "annealing the dielectric layer in an oxidizing ambient." Therefore, the above Species II is changed and included claims 2-6 only.*

Applicant did not state that Claims 18-22 are in a different species from Claims 1-7.

Applicant's statement is as follows:

Species II. First of all, Claims 2-6 of the elected Species II do not recite the limitation of "an oxidizing ambient." Rather, Claims 18-22 of Species II recite the step of "annealing the dielectric layer in an oxidizing ambient." The Examiner has erroneously read a limitation into Claims 2-6.

Appropriate correction is requested.

Generic Claim. The Examiner maintains that no claim is generic. MPEP § 806.04(d) defines a generic claim as follows:

It is not possible...In general, a generic claim should include no material element additional to those recited in the species claims, and must comprehend within its confines the organization covered in each of the species.

For the purpose of obtaining claims to more than one species in the same case, the generic claim cannot include limitations not present in each of the added species claims. Otherwise stated, the claims to the species which can be included in a case in addition to a single species must contain all the limitations of the generic claim.

Once a claim that is determined to be generic is allowed, all of the claims drawn to species in addition to the elected species which include all the limitations of the generic claim will ordinarily be obviously allowable in view of the allowance of the generic claim, since the additional species will depend thereon or otherwise include all of the limitations thereof.

Claim 2 recites:

2. A method of forming a dielectric layer, comprising the steps of:  
*annealing a polysilicon substrate in nitric oxide* at a temperature of less than 800°C. to form an oxynitride layer;  
*nitridizing the oxynitride layer to form a nitride layer*; and  
*depositing the dielectric layer onto the nitride layer*.

Again, contrary to the Examiner's statement, Applicant submits that Claim 2 is generic to the below listed claims. Each of the below listed claims depend on or otherwise include all of the limitations of Claim 2:

- 1) annealing (or heat treating) a polysilicon substrate in nitric oxide;
- 2) nitridizing (or exposing to N-gas) to form a nitride layer;
- 3) depositing a dielectric layer (e.g., tantalum pentoxide, etc.) onto the nitride layer.

Claims 3-6 and 111-147 — which depend from Claim 2  
Claim 7 and depending claims 8-12  
*Claim 18 and depending claims 19-22*  
Claim 23  
Claim 24  
Claim 26  
Claim 27 and depending claims 28-31  
Claim 33  
Claim 34  
Claim 35 and depending claims 36-40  
Claim 41 and depending claim 42  
Claim 43 and depending claims 44-45  
Claim 46 and depending claim 47  
Claim 54 and depending claim 55  
Claim 57 and depending claims 56-62  
Claim 82  
Claim 84  
Claim 85  
Claim 86  
Claim 87 and depending claim 88  
Claim 89  
Claim 90  
Claim 92  
Claim 93  
Claim 95  
Claim 97  
Claim 99 and depending claims 100-104  
Claim 107  
Claim 110  
Claim 148  
Claim 149

To reiterate, Claim 2 recites no material element additional to the elements recited in the above listed claims. Accordingly, Claim 2 should be considered as generic to those claims. MPEP § 806.04(d).

Furthermore, the above listed claims depend from or contain all the limitations of Claim 2, and should be considered by the Examiner in this application. MPEP § 806.04(d).

**Claims 111-149.** In the Office Action at page 3 (2nd last paragraph), the Examiner stated:

"Claims 111-149: wherein the limitation are not completely recite in claim 2 and impose a serious burden to Examiner."

The Examiner statement is in error. Claims 111-149 depend from and include all the limitations of Claim 2. Therefore these claims should be grouped together with Claim 2. MPEP § 806.04(d).

**Claim restrictions.** At pages 4-5 of the Office action, the Examiner *repeated* the claim restrictions stated in the previous Office action —with revised numbering of the Species groups.

The Examiner has failed to consider and address Applicant's remarks filed December 3, 2002, regarding the mischaracterization of the claims. Applicant has previously pointed out errors in the characterization of the claims within the various species designations.

Applicant respectfully directs the Examiner to those comments (at pages 2-4 of the December Response), and requests the Examiner to address Applicant's comments and correct the identification of species.

In sum:

- 1) The Examiner has erroneously read in limitations from the depending claims into the independent claims — i.e., Claims 7, 27, 35, 43.
- 2) The Examiner has erroneously read in limitations from other (non-depending) claims into the independent claims — i.e., Claims 2, 25, 26, 32, 33, 41, 46, 53, 54, 56, 57, 78-80, 83-86.

- 3) The Examiner has also erroneously mischaracterized the claims —  
i.e., Claims 96-110 (Species XIV — now Species XV).
- 4) The Examiner has erroneously read negative limitations into the claims —  
i.e., Claims 48-52 (Species X— now Species XI) and Claims 89-95  
(Species XIV — now Species XV).

Correction is requested.

**Claim limitations.** Finally, at pages 2-3 of the present Office Action, the Examiner has mischaracterized the limitations of the listed claims. The steps of the claims are correctly as follows:

Claims 7-12: recite the step of "nitridizing the oxynitride layer to form a nitride layer by  
exposing the oxynitride layer to a nitrogen-containing gas;..."

Claim 26: recites the step of "forming a nitride layer over the oxide layer by  
exposing the oxide layer to a nitrogen-containing gas;..."

Claims 27-31: recite the steps of "annealing a polysilicon substrate in nitric oxide at a  
temperature of less than 800°C. to form an oxynitride layer;

nitridizing the oxynitride layer to form a nitride layer by exposing the oxynitride  
layer to an activated nitrogen-containing gas to form a nitrided oxide layer; ...

Claims 33 and 34: recite the step of "providing a substrate comprising HSG polysilicon;..."

Claim 35-40 and 41-42: recite the step of "forming a nitrided oxynitride layer over a  
polysilicon substrate...; and forming a dielectric layer over the nitrided oxynitride  
layer." These claims do not recite "forming a HSG, and forming tantalum pentoxide  
over the nitrided oxide layer."

Claims 43-44: recite "A method of forming a dielectric layer in a capacitor container..."

Claims 54-55: recite the step of "forming an oxynitride layer over the lower electrode by  
annealing the electrode in the presence of nitric oxide;..."

Claim 57: provides a method of forming a capacitor comprising the steps of "forming a thin layer of oxynitride over the first electrode layer by annealing the electrode in the presence of nitric oxide; "forming an insulative layer over the oxynitride layer; the insulative layer comprising an insulating inorganic metal oxide material;..."

Claim 57 does not recite "comprising a high K inorganic metal oxide insulating material".

Claim 62 (depending from Claim 57): recites the step of "annealing the polysilicon electrode in the presence of nitric oxide at a temperature of about 700 to about 750°C. to form an oxynitride layer having a thickness of about 40 angstroms or less."

Claims 83, 84, 89, 91, 92, 94, 96, 98, 105, 106, 108 and 109: do not recite the step of "forming a high K dielectric layer" and/or the step of "exposing the dielectric layer to an oxidizing gas".

Claims 83, 91, 94, 96, 98, 105, 106, 108 and 109 recite "wherein upon forming a high K dielectric layer over the nitridized oxide layer, and exposing the dielectric layer to an oxidizing gas, ..."

Claims 84, 89 and 92 recite "wherein upon exposing the dielectric layer to an oxidizing gas,..."

Applicant requests appropriate correction to the Examiner's statements.

Correction and clarification of the Examiner's statement is requested.

Applicant again requests reconsideration and withdrawal of the requirement of the election of species. The generic claim (Claim 2) includes sufficiently few species such that a search and examination of all the species at one time would not impose a serious burden on the Examiner.

Applicant notes that the election of species is for the purpose of prosecution on the merits, and that Applicant will be entitled to consideration of claims to additional species upon allowance of a generic claim. It is understood that if the elected Species II claims are found allowable over the prior art, the Examiner will expand the search to include other species.

Applicant believes that the claims are in condition for allowance, and notification to that effect is respectfully requested.

Respectfully submitted,

*Kristine M. Strodthoff*

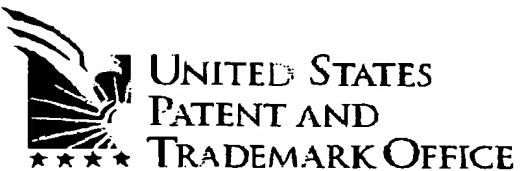
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Dated: March 25, 2003

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